The African Organisation for Standardisation

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ARS 875 (2012) (English): Raw cane sugar -- Specification

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AFRICAN STANDARD

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Raw cane sugar — Specification

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Foreword

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Introduction

Sugar is an important export crop for many African countries. Despite fluctuating prices, global market trends show an increased production and demand for safe and quality raw and white sugar. Consequently, it is important to harmonize this African Standard to help boost the sugar industry and ensure that the locally produced and traded sugars meet the current international standards of safety and quality.

This standard sets a series of minimum requirements to be observed in the production and sale of raw cane sugar as well as essential composition and quality factors, including methods of analysis, necessary for regulatory activity, consumer protection and fair trade.

Raw cane sugar — Specification

1 Scope

This African Standard specifies requirements, methods of test and sampling for raw sugar produced from sugarcane and intended for further processing to make it fit for human consumption or as ingredients in foodstuffs.

Raw cane sugar is partially purified sucrose, which is crystallised from partially purified cane juice, without further purification, but which does not preclude centrifugation or drying, and which is characterised by sucrose crystals covered with a film of cane molasses.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ARS 53, *General principles of food hygiene — Code of practice*

ARS 56, *Prepackaged foods — Labelling*

CODEX Stan 192, *General standard for food additives*

CODEX STAN 193, *Codex general standard for contaminants and toxins in food and feed*

ICUMSA Method GS 1/2/3/9-1, *The determination of polarisation of raw sugar by polarimetry*

ICUMSA Method GS 1/3/4/7/8-13, *The determination of conductivity ash in raw sugar*

ICUMSA Method GS 1/3-7, *The determination of raw sugar solution colour at pH 7.0*

ICUMSA Method GS 1/3/7-3*, The determination of reducing sugars in cane raw sugar, Lane+Eynon procedure*

ICUMSA Method GS 1-5*, The determination of reducing sugars in cane raw sugar, Luff-Schoorl procedure*

ICUMSA Method GS 1-10, *The determination of ash in raw sugar by single sulphation*

ICUMSA Method GS 1-16, *The determination of starch in raw sugar by the BSES method*

ICUMSA method GS 1-17, *The determination of starch in raw sugar by the SPRI rapid starch test*

ICUMSA Method GS 2/1/3/9-15, *The determination of sugar moisture by loss on drying*

ICUMSA Method GS 2/1/3-27*, The determination of lead in sugar products by a colorimetric method*

ICUMSA Method GS 2/3-23, *The determination of arsenic and lead in white sugar, atomic adsorption spectroscopy*

ICUMSA Method GS 9/1/2/3-8, *The determination of raw sugar solution colour at pH 7.0, MOPS method*

ICUMSA Method GS 2/1/7/9-33, *The Determination of Sulphite by the Rosaniline Colorimetric Method in White Sugar — Official (Reference) Method; in VVHP** Raw Sugar — Tentative; in Cane Sugar Juices and Syrups — Accepted; and in Plantation White Sugar — Accepted*

ICUMSA Method GS 2/9-37, *The Determination of the Particle Size Distribution of White Sugar and Plantation White Sugar by Sieving — Accepted*

ISO 4832, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coliforms — Colony-count technique*

ISO 4833, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of microorganisms — Colony-count technique at 30 degrees C*

ISO 6579, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of Salmonella* spp.

ISO 6636-2, *Fruits, vegetables and derived products — Determination of zinc content — Part 2: Atomic absorption spectrometric method*

ISO 6888-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 1: Technique using Baird-Parker agar medium*

ISO 6888-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 2: Technique using rabbit plasma fibrinogen agar medium*

ISO 6888-3, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 3: Detection and MPN technique for low numbers*

ISO 7251, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of presumptive Escherichia coli — Most probable number technique*

ISO 11212-1, *Starch and derived products — Heavy metals content — Part 1: Determination of arsenic content by atomic absorption spectrometry*

ISO 11212-2, *Starch and derived products — Heavy metals content — Part 2: Determination of mercury content by atomic absorption spectrometry*

ISO 11212-3, *Starch and derived products — Heavy metals content — Part 3: Determination of lead content by atomic absorption spectrometry with electrothermal atomization*

ISO 11212-4, *Starch and derived products — Heavy metals content — Part 4: Determination of cadmium content by atomic absorption spectrometry with electrothermal atomization*

ISO 21527-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of yeasts and moulds — Part 2: Colony count technique in products with water activity less than or equal to 0.95*

ISO 21567, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of Shigella spp.*

3 Definitions

For the purpose of this standard the following definitions apply.

3.1

raw cane sugar

centrifugal sugar whose crystals are surrounded by film of molasses and is derived from sugar cane

3.2
ICUMSA unit
international unit developed by International Commission for Universal Methods of Sugar Analysis (ICUMSA) for expressing the purity of sugar and is directly related to the colour of sugar

3.3
polarisation
estimate of the sucrose content of sugar expressed as degrees of polarization

3.4
lot
collection of packages of the same size, type and style which have been manufactured and packaged under essentially the same conditions

4 Requirements

4.1 General requirements

Raw cane sugar shall be

a) in the form of uniform crystals;

b) free from dirt, foreign and extraneous matter; and

c) free from fermented, musty or undesirable odours.

4.2 Compositional requirements

Raw cane sugar shall conform to the compositional factors in Table 1

Table 1 — Composition and quality factors for raw cane sugar

S/No	Characteristic	Requirement/limits	Method of test
i.	Polarisation, °Z	94 - 99.0	ICUMSA Method GS 1/2/3/9-1
ii.	Invert sugar content, % m/m, max	1.2	ICUMSA Method GS 1-5 ICUMSA Method GS 1/3/7-3
iii.	Conductivity ash, % m/m, max	1.0	ICUMSA Method GS 1/3/4/7/8-13
iv.	Sulphated ash, % m/m, max	0.8	ICUMSA Method GS 1-10
v.	Moisture content, % (max) (3 h at 105 °C ± 2 °C)	1.0	ICUMSA Method GS 2/1/3/9-15
vi.	Colour, in ICUMSA units	>1 300 - 6 000	ICUMSA Method GS 1/3-7 ICUMSA Method GS 9/1/2/3-8
vii.	Starch, mg/kg m/m (max)	450	ICUMSA Method GS 1-16 ICUMSA method GS 1-17
viii.	Sulphur dioxide, mg/kg, *Max*	20	ICUMSA GS 2/1/7/9-33
ix.	Crystal size, material to be retained on 500 micron sieve, percent, *Min*	95.0	ICUMSA Method GS 2/9-37
x.	Dextran	<400 ppm	ICUMSA GS1-15, Modified Alcohol Haze Roberts Method

4.3 Safety factor

The safety factor shall be a minimum of 0.3 as calculated from the following: $\frac{\text{moisture content}}{100 - \text{polarization } ^{\circ}Z}$

5 Food additives

White sugar may contain only permitted additives complying with CODEX STAN 192.

6 Contaminants

6.1 Heavy metals

Raw cane sugar shall be free from heavy metals in amounts which may represent a hazard to human health and shall conform to the limits indicated in Table 2:

Table 2 — Maximum permissible levels of heavy metal contaminants

	Parameter	**Requirement**	**ICUMSA Method of test**
i.	Arsenic (As), mg/kg, max	1.0	GS 2/3/9-25 (2007)
ii.	Copper (Cu), mg/kg, max	1.0	GS 2/3-29 (1994)
iii.	Lead (Pb), mg/kg, max	2.0	GS 2/3/9-25 (2007)
iv.	Cadmium (Cd), mg/kg, max	0.05	ISO 11212-4
v.	Mercury (Hg), mg/kg, max	1.0	ISO 11212-2
vi.	Zinc (Zn), mg/kg, max	3.0	ISO 6636-2

6.2 Pesticide residues

Raw cane sugar shall conform to those maximum residue limits established by the Codex Alimentarius Commission.

7 Hygiene

7.1 General requirements

Raw cane sugar shall be prepared and handled in accordance with the requirements ARS 53.

7.2 Specific requirements

The product shall conform to the microbiological limits in Table 3.

Table 3 — Microbiological limits for raw cane sugar

S/N	**Micro-organism(s)**	**Requirements**	**Method of test**
1	Total plate count, cfu/g	10^4	ISO 4833
2	*Staphylococcus aureus* cfu/g max	10^2	ISO 6888
3	*Escherichia coli,* cfu/g, max.	30	ISO 7251
4	*Salmonella*, per 25g, max.	Not detected	ISO 6579
5	*Shigella*, cfu/g, max.	Not detected	ISO 21567
6	Yeasts and moulds, cfu/g, max.	50	ISO 21527-2
7	*Streptococcus hemolytica*, cfu/g, max.	Not detected	

8 Packaging

Raw cane sugar shall be packaged in food grade materials that ensure product safety and integrity.

NOTE Packaging may be required to meet different regulations in the different destination countries.

9 Labelling

In addition to the requirements of ARS 56, the following specific provisions shall apply:

a) the name of the product shall be declared as “Raw cane sugar”;

b) the net contents shall be declared by weight in the metric units (*'Systeme International'*);

c) the name, address and physical location of the manufacturer and/or the packer, distributor, importer, exporter or vendor of the product shall be declared;

d) the country of origin of the product shall be declared; and

e) the declaration, “Not for direct human consumption”.

10 Method of sampling

10.1 General requirements for sampling

In drawing, preparing, storing and handling of samples, the following precautions and directions shall be observed.

a) Samples shall be taken in a protected place not exposed to damp air, dust or soot.

b) The sampling instruments shall be clean and dry when used.

c) When sampling for microbiological purposes, the sampling instruments and containers for samples shall be sterilized preferably by dry heat at 170 °C for 1 h before use.

d) Precautions shall be taken to protect the samples, the material being sampled, the sampling instruments and the containers for samples from adventitious contamination.

e) The samples shall be placed in clean, dry, and moisture-proof containers.

f) The sample containers shall be sealed air-tight after filling and marked with name of material, date of sampling, name of the manufacturer, name of the person sampling and such other particulars of the consignments.

g) Samples shall be protected from light as far as practicable and shall be stored in a cool, dry place.

10.2 Scale of sampling

10.2.1 All the packages of the same size, type and style which have been manufactured and packaged under essentially the same conditions in a single consignment shall constitute a lot. Samples shall be tested separately for each lot for ascertaining the conformity of the sugar.

10.2.2 The number of bags to be selected *(n)* from the lot shall depend on the size (*N*) of the lot and shall be in accordance with the formula:

$$n = \sqrt{N}$$

These bags shall be selected at random from the lot; to ensure the randomness of selection a random number table, as agreed to between the purchaser and the supplier shall be used. In case such a table is not available, the following procedure shall be used:

Starting from any bag, count them as 1,2,3,….. up to *r* and so on in one order, where *r* is equal to the integral part of *N*/*n*, *N* being the total number of bags in the lot and *n* the number of bags to be selected. Every *r* th bag thus counted shall be separated until the requisite number of bags is obtained from the lot to give samples for test.

In case of bags stacked in a pyramidal shape, approximately equal number of bags shall be selected from all exposed sides of the lot, so as to give the required number of sample bags.

10.3 Preparation of sample

10.3.1 Procedure

From the top, middle and bottom portions of each of the selected bags (see 10.2), approximately equal quantity of sugar shall be taken with the help of a suitable sampling instrument. The sample collected from each of the bags shall be thoroughly mixed so as to give a composite sample of 600 g. The composite sample thus prepared shall be divided approximately into three equal parts; one for the purchaser, one for the supplier, and the third for the referee and sealed air tight with particulars as given in 10.1(f).

10.3.2 Number of tests

The composite sample prepared as under 10.3.1 shall be tested for the characteristics as prescribed in Table 1.

10.3.3 Criteria for conformity

The lot shall be declared as conforming to this specification, when the test results on various characteristics obtained on the composite sample satisfy the corresponding requirements.

11 Method of analysis — Determination of pesticides

Pesticide residues shall be determined according to AOAC methods of analysis for pesticides. (970.52, 985.22, and 970.53 of 1990).

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